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Factsheet

USING DHI MONTHLY PRODUCTION REPORTS

(Revision of Factsheet "Using DHI Monthly Production Reports," September 1985)

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Production information is summarized through the DHI system and sent to the dairy herdowner after each test day vist in the form of two reports: (a) Cow Production Monthly Report; and (b) the Monthly Herd Summary.

Monthly herd reports provide information on each cow in the milking herd including test day production, fat %, protein %, accumulated production, and projections of production for the completed lactation. Information is also summarized herd basis to allow comparison of different groups of cows and herd performance over time.

Production information is essential to the efficient and profitable operation of a dairy herd. Production information used to maximum advantage provides the basis for feeding, selection and general management of dairy cows.

Daily Production

Daily milk production in kilograms for the last test day is reported for each cow on the Cow Production Monthly Summary. As well, the fat % and protein % for each cow are reported. The Report also includes total production of milk, fat and protein for each cow for the current lactation as well as projected performance in the form of BCA's for the total lactation.

Daily production information is important to formulating a **Feeding Program** and monitoring **Herd Performance**.

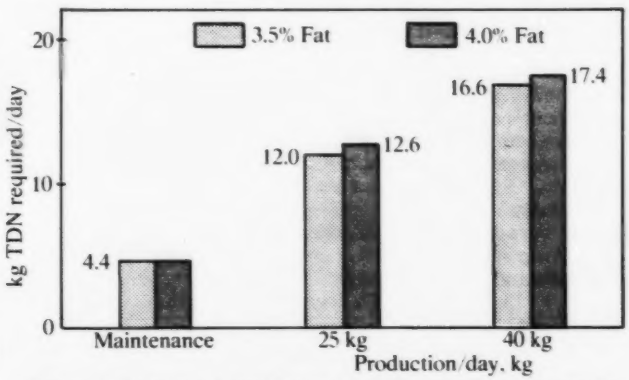

Figure 1. Relation of production level, fat test to energy requirements of lactating cows, 625 kg bodyweight.
— *NRC Nutrient Requirements for Dairy Cattle*, 1978

Feeding

The amount of energy, protein, calcium and phosphorus required by the dairy cow is directly related to her daily production of milk and fat. The cow's diet, especially the grain and supplement portion, should be adjusted according to the requirements of the cow.

Figure 1 shows cow requirements for energy for maintenance, compared to medium and high production. Production at 3.5% fat and at 4.0% fat is also compared. Required levels of protein, calcium and phosphorus show a similar relationship to daily production.

Grain and supplement feeding should be adjusted immediately after test day according to the quantity of milk and fat that each cow has given. Being able to feed according to production is the most important benefit available to the herdowner as a result of being on a milk recording program. Some other things to consider in a feeding program are:

The Feeding Program should be based on:
- Analysis of representative samples of the forages in the ration.
- Weigh the quantities of feeds used.
- Balanced feeding program according to recognized nutritional standards (NRC).
- Begin feeding grain 10-14 days before calving at a rate up to 4-4.5 kg per day.
- Increase grain feeding gradually after calving — allow 3 weeks to increase grain until cow is on maximum intake.

Adjust feeding levels after each test day. Many herdowners measure production of early lactation cows one or two times between test days to adjust their feeding levels.

Monitoring Herd Performance

Herd and individual cow performance can be monitored by comparing test day milk production directly to a standard lactation curve or through BCA projections.

BCA Projections

BCA's (Breed Class Average) are calculated for each cow based

Figure 2. Regular measurement of milk production and sampling for analysis is the basis for management and selection decisions in the dairy herd.

Figure 3. Grain and other supplements should be fed according to daily production of milk and fat. Grain feeding levels should be adjusted after each DHI test.

on the amount of milk, fat or protein that she has given. Adjustments are made according to the breed of cow, her age and season of calving. Example BCA's are shown in Table 1.

BCA Projections

BCA projections are calculated starting at the first test in the lactation and are reported for each cow along with the deviation from herd average on the Production Monthly Report.

Since BCA's are calculated based on a standard lactation curve, changes in BCA projections from one month to the next could signal that there are problems related to the management of those particular cows. The change in BCA from one test day to the next is summarized for the herd in the Monthly Herd Summary. Changes of 10 BCA's or more would indicate a significant shift in production.

Comparison of BCA's from one test to another rather than actual milk yields has the advantage that BCA's are age- and season-adjusted. Each cow is compared to the appropriate lactation curve.

Table 1. Standards for 100 BCA for 305 day milk and fat production (cows calving in April)

Age Months	Milk kg	Fat kg	Age Months	Milk kg	Fat kg
Ayrshire			**Brown Swiss**		
24	2832	119	24	3170	129
36	3309	137	36	3703	150
48	3629	149	48	4062	163
60	3828	157	60	4285	171
Guernsey			**Holstein**		
24	2815	142	24	3908	143
36	3185	161	36	4457	165
48	3430	173	48	4890	181
60	3579	180	60	5115	190
Jersey					
24	2488	133			
36	2918	156			
48	3206	175			
60	3384	184			

All BCA values are adjusted for month of calving as well as age of cow at calving.

Lactation Curve

Daily milk production follows a typical trend from calving to drying off called a lactation curve. Typical lactation curves for various levels of production are shown in Figure 4.

Peak Milk

Peak milk is extremely important and occurs with most cows at 40 to 60 days after calving. Peak Milk determines to a great extent the total production per lactation. Total lactation yield in mature cows can be estimated by multiplying the peak daily production by 213. For every increase of 1 kg of milk at peak production there is an increase of just over 200 kg in the total lactation.

A cow in first lactation typically peaks later in lactation (Figure 4), does not peak as high, and carries out production better in later lactation.

Cows that show no real peak in production or that peak at 20-30 days after calving are generally not milking to their full potential. Inadequate supplementation of energy, protein, calcium or phosphorus in early lactation as well as inadequate management before calving are prime reasons for poor peak production.

Persistency

How well a cow maintains her production level throughout the lactation is known as **persistency**. Typically production after peak milk declines by about 10% per month. The production of first-calf heifers declines by about 8% per month (Figure 4).

Many factors can affect persistency: lactation number, genetics, calving interval, nutrition, and health can all affect persistency to varying degrees. If major changes occur in lactation persistency (large change in projected BCA's from month to month) the herdowner should review cow and herd management.

Irregular Production

The production (or fat %) for one test day or one milking may be significantly different from other test days. This is marked on the report with a "data flag". Sudden variations

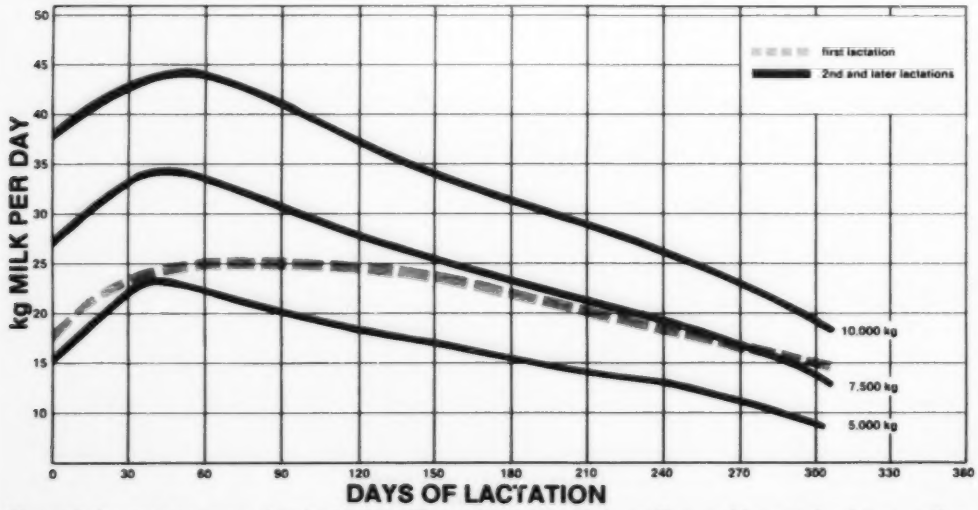

Figure 4. Lactation curves of typical dairy milk production for high, medium and low production as well as for a first lactation cow producing 6,000 kg of milk.

may be due to one of a number of reasons:
poor milk out
mastitis
other infections or metabolic disease
cow in heat
injury
sudden change in weather

Irregular production, especially a drop in production, can be used to alert the owner. Daily production can be used as a management tool to detect herd and cow problems. Monitoring daily production is only practical when automated, in-place milk measuring devices can be used.

MILK COMPOSITION

Fat %

Each sample of milk from each cow is tested for fat % and protein % and yield calculated for each lactation.

The average fat and protein percentages for each breed are given in Table 2.

Table 2. Average Fat % and Protein % by Breed

Breed	Milk Kg	Fat %	Protein %
Ayrshire	5744	3.97	3.36
Brown Swiss	5722	4.05	3.50
Guernsey	5189	4.70	3.62
Holstein	6937	3.72	3.19
Jersey	4695	4.94	3.88

ODHIC — 1986 Averages

Fat % and protein % are highly heritable (.5) traits meaning that rapid improvement can be made by selection. They also have a high positive correlation (.6) meaning that they tend to vary together. Fat %, however, has more variation and is affected by more management factors than is protein %.

Rapid genetic gain can be made in selection for fat % due to its high heritability. Selection for fat % alone will, however, have a negative effect on milk yield.

Fat % decreases rapidly after calving and reaches its lowest point with most cows at 1 to 2 months after calving — the time of peak milk production.

Low Milk Fat Syndrome is a situation with severely lower milk fat percent. Usually, the fat % will drop to abnormally low levels while the protein % will remain the same or rise slightly. This causes the fat % to be lower than the protein % — called a **fat-protein inversion**.

To determine if your herd has a problem with Low Milk Fat Syndrome, check the following:

1. Herd average fat % lower than protein % for test day.
2. Greater than 20% of cows on test day with fat % lower than protein %.

Should you find that you have a problem it is usually related to the feeding and management of the milking herd. Check the following:

1. Average fat % in the Test Day Summary (last 12 tests).
2. Check for a pattern — specific months, seasons.
3. Check OMMB statements to see if there is a similar pattern.
4. Compare fluctuations in herd test with any changes in feeding or management of the milk cows which may have occurred at that time.

If the solution to the problem is not obvious to you, seek assistance through OMAF Factsheets, the OMAF office or dairy specialist, or your nutritional consultant.

Protein %

Protein % is affected very little by feeding or management practices. Gains in protein yield can be accomplished through breeding and selection, although less progress would be made than with fat % due to the lower natural variation in protein %.

Percent lactose and minerals show little cow-to-cow variation and are not measured in the DHI system.

HERD AVERAGES

Herd averages can be used to compare progress in the herd over the years or with other producers. Herd averages by breed for Ontario are given in Table 3.

Table 3. Average BCA by Breed for Ontario Herds on Supervised Test for 1986.

Breed	No. Records	BCA Milk	BCA Fat	BCA Protein
Ayrshire	4792	159	154	162
Brown Swiss	935	142	144	142
Guernsey	2698	154	145	157
Holstein	165120	145	147	147
Jersey	7163	151	139	156

ODHIC — 1986 Averages

The herd averages for milk, fat and protein are reported in three ways:

1. **Rolling Herd Average** provides an average production of all cows completing a 305-day record in the past 12 months. It gives the average production and also gives the average BCA's which are adjusted for breed, age of cow and season of calving.
2. **Previous 12 Month Production** gives the average production per cow over the past 12 months for all cows in the herd. The number of cows is reported as "Cow Years". This is the total number of cows in the herd over the past 12 months. This includes dry cows and nurse cows. Cows that were in the herd for only part of the year are included for the appropriate length of time.

Previous 12 Month Production gives the average productivity of the whole herd over the 12-month period. The average production × number of cow years should compare with the total amount of milk shipped per year. This average production is useful in predicting the cash flow for the dairy herd as it reflects the true production per cow in the herd.

In a herd with a long calving interval the average production in the Previous 12 Month Production will be much lower than the average production in the Rolling Herd Average. If the herd has nearly a 12-month calving interval the two values will be nearly equal.

3. **Projected and Actual BCA** in the Test Day Summary (Previous 12 months) gives an average BCA for the herd, updated every test day. The trend in herd average and progress over the past year can be followed as the 12 previous test days are summarized in the table. This average includes all projected BCA's; therefore it is a prediction of what the Rolling Herd Average will be a few months in the future. It gives a more up-to-date picture of progress within the herd than does the Rolling Herd Average, which tends to be more historical.

SELECTION AND CULLING

Culling Decisions

Cows with BCA deviations significantly below herd average should be considered for culling from the herd. In most herds, cows with BCA deviations of −15 or below are in this category.

Studies have shown that the value of milk and fat produced per lactation (Cow Dollar Difference) by the top-ranked cows in the herd is $500 to $700 above herd average. Those cows at the bottom of the herd produce milk valued at $500 to $700 less than the average. The difference in gross returns between the top cow in the herd and the bottom is often $1000 to $1500. The difference in income is good reason for culling the lowest producing (or lowest in Cow Dollar Difference) cows in the herd.

Other considerations

Cows with low BCA's may not be culled due to events that may have affected their production of that year such as:

Difficulties or injury at calving
Birth of twins
Illness
Poor body condition before calving

Sometimes a small number of replacements makes it necessary to keep heifers that would normally be culled.

These cows are not returning income to the farm in this year, and may actually be losing money; however, there may be enough reasons to keep them, breed them again and give them a "second chance" in the next lactation. Should these cows not produce up to

herd average by 60 to 90 days into the second lactation, they should be culled.

Cows with high production indexes may be kept in the herd even though they are below herd average. In most situations cows significantly low in production should be culled regardless of index as they are losing money. Cow Production Indexes indicate the long-term improvement of the herd, and should be used in solving a close decision between two cows and in the selection of heifers and breeding stock.

Other factors may bring about culling of some cows which are good producers in the herd: injuries, illness, reproductive failure, type faults, and severe and chronic mastitis.

The culling rate in most Ontario dairy herds is between 25% and 30% per year. Culling for productive reasons should be 20% per year. Good management should limit involuntary culling to 10% per year.

OTHER MANAGEMENT INFORMATION

The **Test Day Summary** gives the average of BCA's for milk, fat and protein for **1st lactation** cows versus all 2nd and later lactation cows. The proportion of the herd in first lactation as well as those cows entering and leaving the herd can be monitored.

BCA's of the first-lactation cows should be equal to or better than herd average. If they are consistently lower than herd average BCA, check the following:

1. Genetic level of sires of first-lactation cows.
2. Size and body condition of heifers before they calved.
3. Access to feed and water — 1st lactation heifers are not as aggressive as older cows.
4. Balancing of milk-cow ration. Due to growth requirements, a problem with the milk cow ration may show up first in the 1st lactation heifers.

Calving Interval

Calving interval has a direct effect on average production per cow per year. Longer calving interval means lower average production per cow in the herd and therefore lower herd profit. It is therefore important to monitor the number of days open and the calving interval of the herd.

It is important to report all breeding dates (AI and natural service) in order to have useful calving interval information on the herd reports.

Table 4. Relation of Days Open to Calving Interval

Days Open	Calving Interval	
	Days	Months
60	342	11.2
80	362	11.9
100	382	12.5
120	402	13.2
140	422	13.8

Days Open are reported for each cow in the Cow Production Monthly Report. Days open should be less than 100 days. Table 3 shows the relation of days open to calving interval. The cost per day in Ontario for every day a cow is open past 100 days is $2.55.

Studies on herd profitability show that the most profitable herds have calving intervals of about 12.5 months. Although a few cows such as 1st calf heifers may benefit from a 13-month calving interval. A 12.5-month calving interval is still a practical goal. A calving interval of over 13 months indicates a herd breeding problem.

The Monthly Herd Summary reports the Average Calving Interval for the previous 13 months. This represents past reproductive performance. The Projected Calving interval is shown in the Stage of Lactation Profile based on the average days open for cows in each state of lactation. This information gives the herdowner some warning that a reproductive problem may be occurring.

Stage of Lactation

Breakdown of herd information by 4 stages of lactation plus dry period indicates trends in the herd in production, fat and protein yield, breeding success.

The percent of the herd in each stage of lactation shows how uniform the calving period is the year round. It is also related to the length of calving interval. The ideal proportions of cows in each stage of lactation, with a 12-12.5 month calving interval are shown in Table 5.

Table 5. Proportions of the Herd in Stage of Lactation

Stage of Lactation	Percent of Herd
0-99 days	25-30%
100-199 days	25-30%
200-305 days	25-30%
Over 305 days	0-10%
Dry	15%

Stage of Lactation can be used to evaluate the average daily production in a herd. An unusually high proportion of the herd in early lactation indicates higher than usual daily average production. A high proportion of the herd in late lactation indicates a lower than usual daily production. Similarly, days in milk should average 150-160 days if there is an even calving pattern, year round, and relatively even production year round.

Summary

DHI herd monthly reports provide information on an individual cow basis and as a herd summary. These reports allow the operator to evaluate individual cows and herd production and efficiency. The operator can then adjust feeding and management practices, make selection and culling decisions to improve efficiency and profitability of the dairy herd. Used in daily herd management decisions, DHI production reports can be the most valuable information available on the dairy farm.

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